



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,217	06/30/2003	Arthur E. Dixon	58305.0005	1800
24629	7590	02/24/2005	EXAMINER	
DARYL W SCHNURR MILLER THOMSON LLP PO BOX 578 SUITE 700, 22 FREDERICK STREET KITCHENER, ON N2G 4A2 CANADA			CONSILVIO, MARK J	
			ART UNIT	PAPER NUMBER
			2872	
			DATE MAILED: 02/24/2005	

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/608,217	Applicant(s) DIXON ET AL.	
	Examiner Mark Consilvio	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
 4a) Of the above claim(s) 3-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7, 9-23 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06-03-2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

Applicant's election of Species I in the reply filed on 12/23/2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Therefore, claims 3-6 are withdrawn from consideration.

Claim Objections

Claims 7-13 and 18-20 are objected to for the following reasons: The multiple dependent claims 7-13 and 18-20 alternately depend on non-elected claims 3 and 4. Appropriate correction is required.

Claim 8 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claim 8 has not been further treated on the merits.

Claim 15 recites the limitation "said focal plan array" in its last line. There is insufficient antecedent basis for this limitation in the claim. For the purposes of examination, this limitation will be read as equivalent to the detector from claim 1.

Claim 19 recites the limitation "a spot and a line" in its last line. There is insufficient antecedent basis for this limitation in the claim. For the purposes of examination, this limitation will be read as "a spot or a line."

Art Unit: 2872

Claim 20 recites the limitation "water and oil" in its last line. There is insufficient antecedent basis for this limitation in the claim. For the purposes of examination, this limitation will be read as "water or oil."

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by White et al. (US Patent No. 6,169,289).

With respect to claim 21, White et al. discloses a liquid immersion scan lens comprising a scan lens (20) for use with an object (22), said scan lens having an external entrance pupil (top of 25) for focusing light on said object in a prescribed object plane (23), said scan lens having an immersion liquid filling a space between said scan lens and said object (fig. 1).

Claim 22 is rejected under 35 U.S.C. 102(b) as being anticipated by Dixon et al. (US Patent No. 5,532,873).

With respect to claim 22, Dixon et al. discloses a method of constructing a scanning beam optical imaging system for macroscopic imaging of an object, said system having an illumination source (102) producing a light beam (103) directed upon an optical path toward an object (130), a scanner for scanning the light beam, a detector (156) located to receive light from

Art Unit: 2872

said object plane, a display (412) to produce a signal from said detector, said method comprising inserting a scan lens having an external entrance pupil (304) for focusing said light beam to a diffraction-limited configuration in a prescribed object plane and scanning said light beam using said scanner to move the diffraction-limited spot in a predetermined scan pattern on said object plane (fig. 3a and col. 7, lines 14-43).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7/1, 7/2/1, 9/1, 9/2/1, 10/1, 10/2/1, 11/1, 11/2/1, 14-17, 19/1, 19/2/1, 19/14/1, 20/1, 20/2/1 and 20/14/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of Stimson et al. (US Patent No. 6,134,002).

With respect to claim 1, Dixon et al. discloses a scanning beam optical imaging system for macroscopic imaging of an object, said system comprising: a) an illumination source (102) producing a light beam (103) directed upon an optical path toward an object (130); b) a scan lens (302) having an external entrance pupil (304), for focusing said light beam to a diffraction-limited configuration in a prescribed object plane; c) a scanner (114, 120) for scanning said light beam to move said diffraction-limited configuration in a pre-determined scan pattern on said object plane; and e) a detector (156) located to receive light from said object plane and a display (412) to produce a signal from said detector. Though Dixon et al. teaches a variety of different

Art Unit: 2872

scan lens may be used, Dixon et al. is silent to a liquid immersion scan lens. Stimson et al. discloses a scan lens (326) being a liquid immersion scan lens with an immersion liquid (oil) filling a space between said scan lens and said object (col. 6, line 45+). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Dixon et al. and Stimson et al. to provide a liquid immersion lens and immersion liquid of Stimson et al. to the imaging system of Dixon et al. One of ordinary skill in the art would have been motivated to do this to provide a large numerical aperture improving resolution and decreasing the time to image an object.

With respect to claim 2, Dixon et al. discloses the system is a confocal imaging system and there is a detection arm located between said object and said detector, said detection arm receiving light from said diffraction-limited configuration in said object plane, said detection arm having a pinhole (138) and a focusing lens (136) to obtain a focal point for confocal detection of said light returning from said object, said detector being located behind said pinhole, there being a beamsplitter (112) located between said detection arm and said object, said beamsplitter directing light returning from said object into said detection arm (fig. 3a).

With respect to claims 7 and 17, Dixon et al. discloses the scan lens may be a telecentric $f^*\theta$ scan lens (400) (fig. 4a). The modification to a liquid immersion scan lens has been described supra regarding claim.1.

With respect to claim 9, Dixon et al. discloses there are means for supporting (208) said object (130) to be observed and measured (fig. 3a).

With respect to claim 10, Dixon et al. discloses a reflection-type microscope but does not disclose a transmission arrangement. However, such arrangements are well know in the art and

Art Unit: 2872

rearrangement to a transmission-type microscope is well within the ability of one of ordinary skill. A typical transmission-type arrangement would include a second condenser lens and a transmission detector placed on an opposite side of said object, said condenser lens and said transmission detector being coaxial with said scan lens, whereby light transmitted through said specimen is detected. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. and move the detection arm for a variety of reasons including size, balance, or space constraints.

With respect to claim 11, Dixon et al. discloses said illumination source (102) is a laser (fig. 3a).

With respect to claim 14, Dixon et al. discloses said imaging system being a real-time imaging system, there being a rotating Nipkow disk located between said illumination source and said object, said Nipkow disk producing a plurality of expanding beams moving toward said object, there being a focusing lens rigidly mounted a distance equal to a focal length of said focusing lens above an entrance pupil of said scan lens, said focusing lens also being a distance equal to a focal length of said focusing lens below said Nipkow disk, said focusing lens and said scan lens in combination focusing said expanding beams to diffraction-limited configurations in a prescribed object plane, said light from said object plane returning through said Nipkow disk with means for focusing said light returning through said Nipkow disk to produce a real image, said detector detecting said image (col. 6, lines 37-47).

With respect to claim 15, Stimson et al. discloses the detector a charged coupled array (342) (fig. 3).

Art Unit: 2872

With respect to claim 16, Dixon et al. discloses said imaging system is a real-time scanning optical microscope (col. 3, lines 17-30 and col. 6, lines 37-47).

With respect to claim 19, Dixon et al. discloses said diffraction-limited configuration is one of a spot or a line (col. 4, lines 46-49).

With respect to claim 20, Stimson et al. discloses said immersion liquid is one of water or oil (col. 6, lines 44-46).

Claims 1, 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of White et al. (US Patent No. 6,169,289).

With respect to claim 1, Dixon et al. discloses all the limitations of claim 1, except the liquid immersion scan lens as stated supra. White et al. discloses a liquid-immersion scan lens (25) with an immersion liquid filling a space between a scan lens and an object. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. with the lens of White et al. to provide a large numerical aperture improving resolution for the imaging system.

With respect to claim 12, Dixon et al. discloses all the limitations of claim 1, except the liquid-immersion scan lens, as stated supra, and the further limitations of claim 12. However, White et al. discloses a laser rejection filter (not shown) is placed in front of a detector (35), said imaging system being a multi-photon or two photon imaging system wherein an illumination source (11) is a short pulse laser to excite multi-photon or two-photon fluorescence respectively in a specimen (22), said laser rejection filter filtering out a signal from said laser, the immersion liquid increasing a numerical aperture of said liquid-immersion scan lens (25), thereby increasing

Art Unit: 2872

an intensity of light at a focal point of said lens and improving multi-photon or two-photon absorption respectively (col. 5, line 47-col. 6, line 45). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. with the arrangement of White et al. to provide maximum resolution for the imaging system.

With respect to claim 23, Dixon et al. teaches a method of constructing scanning beam optical imaging system for a macroscopic object, said system having a multi-photon laser source producing a light beam directed along an optical path toward an object, a scanner for scanning with a light beam, a detector located to receive light from said object plane and a display to produce a signal from said detector, said method comprising inserting scan lens for focusing said light beam to a diffraction-limited configuration in a prescribed object plane without forming an image plane between said scan lens and said object plane and scanning said light beam using the scanner to remove said diffraction-limited configuration in a predetermined scan pattern on said object plane. Dixon et al. does not teach a short pulse laser or a liquid-immersion scan lens. White et al. teaches both a short pulse laser and a liquid-immersion scan lens as stated supra regarding claim 12. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. with the arrangement of White et al. to provide maximum resolution for the imaging system.

Claims 13/1 and 13/2/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of Stimson et al. (US Patent No. 6,134,002) and in further view of Guerra (US Patent No. 5,349,443).

Art Unit: 2872

Dixon et al. and Stimson et al. teach or suggest all the limitations of claim 1 and 2 as stated supra. Dixon et al. and Stimson et al. are silent to the limitations of claim 13. However, Guerra shows a sidewall (36) surrounding objective lens (10'), said sidewall extending between said scan lens and said object (S), said sidewall having a substantial sealing relationship with said scan lens and said object to retain said immersion liquid (32) of said liquid-immersion scan lens between said scan lens and said object. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. and Stimson et al. to provide a sidewall to contain the immersion liquid. One would be motivated to do this to allow for easy application and cleaning of the liquid.

Claims 18/1, 18/2/1, and 18/14/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of Stimson et al. (US Patent No. 6,134,002) and in further view of Trappe et al. (US Patent No. 4,208,101).

Dixon et al. and Stimson et al. teach or suggest all the limitations of claims 1, 2, and 14 as stated supra. Dixon et al. and Stimson et al. are silent to the limitations of claim 18. However, Trappe et al. teaches an immersion objective and a part of the lens closest to the object is spring mounted (col. 3, lines 38-44). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. and Stimson et al. to make a part of the lens closest to the object spring mounted. One would be motivated to do this to provide an added seal against leaking of the immersion liquid into the objective.

Art Unit: 2872

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Consilvio whose telephone number is (571) 272-2453. The examiner can normally be reached on Monday thru Friday, 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Mark Consilvio
USPTO Patent Examiner
Jefferson, 3C21 AU-2872
(571) 272-2453



DREW A. DUNN
SUPERVISORY PATENT EXAMINER